SOME FIELD NOTES ON QUEENSLAND INSECTS.

By Henry Hacker, F.E.S.

Order HYMENOPTERA, Family SPHECIDÆ.

Sphex (Isodontia) nigellus, Smith.*—The recorded habits of members of the genus Sphex show much similarity. They have generally been found to make underground burrows terminating in a chamber, in which they store different kinds of insects as food for their young. This season I had an opportunity of observing something of the economy of *Sphex nigellus,* and can record a remarkable difference from the usual habits of wasps belonging to the genus.

This species utilises for nests old beetle burrows in posts and dead trees, which it closes by stopping tightly with grass-seeds. On several occasions while examining posts full of old disused tunnels, which had evidently been made by some beetle, I had noticed that a number of the holes had been recently used by some other insect which had stopped them up with grass-seeds, leaving tufts protruding about a quarter of an inch. I did not connect this fact with the wasp until some time later, when Professor Skertchly brought to the Museum part of a large log similarly affected. This block was cut in two, one piece being left intact with the intention of breeding out the insects. The other piece was chopped up, thus exposing the tunnels. The section of a tunnel when exposed gave one a good insight into the methods of this wasp. In nearly every instance the tunnels were found to curve downwards from the entrance for about half their length, the rest of the distance being nearly horizontal; the average length was from three to four inches. The egg was evidently laid at the extreme end of the tunnel, a space large enough for the metamorphoses of the insect being left there. In this space also was stored the provisions (consisting of spiders) for the larva. The remainder of the tunnel was packed with grass-seeds, which were loosely packed at first, but got tighter as the entrance of the tunnel was reached. The grass-seed used by this wasp for the purpose of plugging the entrance to the tunnel is *Andropogon pertusus,* Willd. (Queensland Flora, vol. 6, p. 1863), which it skilfully manages to place with all the axillary ends directed inward, leaving the plumose ends protruding like a brush. Taking into consideration the shape of the seeds, and the fact that the wasp had to push them in from the outside, this was the only method by which it could plug the hole tightly. This arrangement made the tunnel quite

* The insects mentioned in this paper are exhibited in the Insect Court at the Queensland Museum.

impregnable against the attacks of enemies from the outside, whilst it enabled the mature wasp inside to push its way out without much difficulty.

Most of the tunnels exposed by splitting the log contained either a larva or a pupa. In two instances tunnels contained a fully developed wasp ready to emerge. In some of the tunnels, however, the matured insect had already emerged. In these cases a small quantity of loose grass-seed remained in the part where it had been packed loosely, while the entrance was quite open. From this I concluded that the insect, in order to escape, had forced its way past the loosely packed seeds and pushed out bodily the tightly packed plug at the entrance.

R. E. Turner states*—"This species seems to occur throughout Southern Asia and also in West Australia." It would be interesting to know if this insect has a similar economy in Asia, or whether it has acquired the above habits only in Australia.

The Director of the Queensland Museum is indebted to Professor Skertchly for drawing his attention to these insects in the first place.

Superfamily VESPOIDEA.

Family POMPILIDÆ.

Pseudagenia camilla, Turner.—A number of the clay cells of this species were obtained in Victoria Park, Brisbane, on May 24th. They were all attached a few inches above the ground to the sides of large stones where the slope was sufficient to give them shade and shelter. Most of the cells were placed singly. In some cases there were two and three together, fastened side by side, but never more than three. They were oval in shape, 14 mm. long and 7 mm. broad, being very neatly and symmetrically made with small pellets, which gave them a granulated appearance. On opening one of the cells it was found to contain a pupa enclosed in a thin transparent skin. The wasps emerged between the 6th and 12th of June. They eat a small circular hole in the end of the cell just large enough to enable them to escape. After emerging, they rest for a few minutes on the outside of the cell, but soon become very active, running and flying about the jar in which they were confined.

This wasp is easily identified by the shape of the clypeus, which is produced at the apex into a long blunt tooth. This character at once separates it from the other species of the genus.

Family THYNNIDÆ.

During last season I paid special attention to the wasps belonging to the above family, the total number collected in the Brisbane district being seventy-five species. Out of forty species which have been examined by R. E. Turner,

* Proc. Zool. Soc. Lond. 1908, p. 467.

twelve species, or 30 per cent. of them, were new to science. The remainder have not yet been identified. The majority were taken on various flowering shrubs, the most attractive flowers being *Leptospermum flavescens, Leptospermum scoparium, Baeckea virgata,* and *Lomatia silaifolia.*

One species of Thynnid, *Ariphron petiolatus,* Sm., according to my experience, seems to be exceptional in that it does not frequent flowers to the same extent as the other species. Out of twelve specimens taken during the season, one male was caught on the wing, one male and female were caught in copulation on the wing, four pairs were taken in copulation on the trunk of a standing dead tree, and one male only was taken on flowers.

An interesting fact which I have observed regarding the history of these wasps is that a number of the small and medium-sized species are double-brooded, and the point may assist in throwing some light on the earlier stages of these insects. *Thynnoturneria cercroides,* Sm., *Rhagigaster unicolor,* Guér., *Thynnoides fulvipes,* Guér., *Lestricolhynnus sp.* new, and three undetermined species were taken on Leptospermum flowers in September, and greatly to my surpise the same seven species were again captured at the end of April, a number of them being in copulation on flowers of *Baeckea virgata,* which, owing to the unusually wet summer, was then flowering for the second or third time. The fact that a number of this late brood were taken in copulation shows that they were newly emerged and not stragglers from the spring brood, and I am further of the opinion that this proves that the hosts are double-brooded also.

Superfamily ICHNEUMONOIDEA, Family EVANIDÆ.

Megalyra fasciipennis. Westwood.—This usually rare insect was captured around Brisbane in four different localities during last season. At Tambourine Mountain, on October 23rd, several females were taken flying round the trunk of a standing dead tree in a newly burnt "clearing." Another female was taken on October 28th (on a fallen tree) at Morningside, near Brisbane. On the occasion of a fortnight's collecting trip on Stradbroke Island during December, both sexes were caught on some grey gums felled the previous year. At Kelvin Grove during the first week in January, a capture of both males and females was made on trees cut down four months previously.

During the Stradbroke trip, being desirous of obtaining a good series of this curious insect, I visited the same logs every day for eight days, but did not see any females although the males were plentiful. On the ninth day, however, the females appeared, and afterwards were as numerous as the males. One female was observed with her ovipositor wedged so tightly in a crevice in the bark that there was no difficulty in catching her without the aid of a net.

On chopping into the log several larvæ and pupæ of a Longicorn Beetle were found, which were ascertained by breeding out to be *Phoracantha recurva,* Pascoe. It is fairly certain that the female Megalyra was ovipositing in one of the beetle larvæ when captured.

Superfamily PROCTOTRYPOIDEA.

Aphanomerus rufescens, Perkins.*—This wasp is parasitic in the eggs of the Homopterous insect *Colgar peracuta,* Walker, belonging to the family Fulgoridæ. The host is a common insect in our fields and gardens, and lives upon a number of different trees and shrubs. Its egg capsules are disc-shaped, pale green in colour, and are firmly glued to the underside of the leaves; the side nearest the leaf being flat, while the outer side is convex. There are usually between forty and fifty eggs in each capsule. The eggs are ovate-oblong, with a carina at each end extending longitudinally for about one-third of the length. These carinæ split when the eggs hatch, making elongate openings through which the young nymphs escape. The parasite, however, does not emerge through the longitudinal carina as does the rightful occupant, but eats a small hole in the side of the eggshell.

There appear to be several broods of *Colgar peracuta* in the course of a year, but, judging from the few scattered observations which were made, I am inclined to think that the parasite only attacks eggs belonging to the winter brood.

Last June and during the early part of July the parasites were observed in numbers on the underside of Canna leaves. A few were seen walking about the leaves, but the majority were in groups, quite stationary, in the immediate vicinity of small clusters of the Fulgorid nymphs. These nymphs were seen at the same time on the underside of the leaves. Towards the middle of July the nymphs had become adults, and the parasites had entirely disappeared. No more parasites were seen until June of the following year, when they again occurred in numbers under similar conditions.

We are indebted to Mr. A. A. Girault for his kindness in the identification of the parasite.

Order COLEOPTERA, Family TENEBRIONIDÆ.

Byrsax macleayi, Pascoe.—In November, 1912, while collecting insects on Tambourine Mountain, I came across some large dead fungi of the genus Polyporus attached to a fallen tree. On breaking a piece it was found to contain several beetle larvæ. These were not minutely examined at the time, but it was noted that they were white, shining, semi-transparent, short, stout, and about the size of a pea. They were scattered through the fungus, each larva

* Bull. Agricultural Exp. Stat. Hawaii, i, p. 202.

being isolated in its own chamber or cavity. A tin was filled with pieces of the fungus, and was examined at intervals on subsequent occasions. On February 3rd, 1913, one of the beetles emerged, and it was found to be a peculiar fungus-beetle, *Byrsax macleayi*. The rest of the fungus was then broken up and several specimens of the same species were obtained. They were all fully developed, although each individual was confined to its own cavity. A few, however, were rather soft and of a reddish brown colour, evidently only just having changed from the pupal state, but no pupæ were seen. There was a quantity of excrement in the form of fine dust in each cavity containing a beetle.

While extracting the beetles a fully developed specimen of a beetle (near, if not a Pylus) of the Cleridæ was obtained in one of the Byrsax cavities. As the fungus had been kept in a tin with a tightly fitting lid since it was obtained, it seems probable that the Clerid was predaceous upon the Byrsax larvæ. And as the majority of species of the Cleridæ are known to be predaceous upon other insects, finding this specimen actually in the cavity formed by a Byrsax makes it almost certain that it does feed upon that species.

Order NEUROPTERA, Family ASCAPHALIDÆ.

Stilbopteryx costalis, Newman.—This remarkable insect, which is the largest representative of the family, occurs on Stradbroke Island, and may be captured in numbers in December, when one is acquainted with its habits. They appear on the wing at sunset and can be seen until it becomes too dark to distinguish anything. They fly strongly about fifteen to twenty feet from the ground, just clearing the tops of the bushes and stunted trees, evidently catching other insects on the wing in the same manner as do the Odonata. This Ascaphalid, however, differs considerably in its method of flight from that of a Dragonfly. It does not attempt to swerve, or change its course suddenly, but continues very swiftly in a straight line. The best method to effect capture is to attach the net to a long stick, and when one is seen approaching to suddenly raise the net, holding it up in its line of flight. If the distance has been judged correctly, the insect will fly straight in, as it seems incapable of making a sudden swerve.

R. J. Tillyard (to whom we are indebted for the identification of the above insect) informs me that it is widely distributed from Cape York to the Blue Mountains, and also in South-western Australia, and that it is very variable. He also says: "This insect, together with a Brazilian species, form together the subfamily Protascalaphinæ, distinguished by their large size and short antennæ. Some authors still regard them as Myrmelionidæ, but the truth is that they are an archaic group standing near the base of the phylogenetic stem out of which both Ascalaphids and Myrmelionids arose."